GENERAL DYNAMICS World

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Keel for Nation's First LNG Tanker Laid at Quincy Yard

Construction is underway on the nation's first giant liquefied natural gas ship, which the head of the U. S. Maritime Administration declared will "play a key role in alleviating our energy shortage in years ahead."

Robert J. Blackwell, Assistant Secretary of Commerce for Maritime Affairs, said that the keel-laying of the 936-foot LNG tanker at General Dynamics' Quincy shipyard "heralds the entry of the American maritime industry" into new technology and a new market.

Blackwell noted that the Merchant Marine Act of 1970 has generated $2.4 billion in shipbuilding contracts, resulting in a peacetime record of nearly 90 ships being built in U. S. shipyards.

He pointed out that fuel-carrying ships predominate the new construction programs. The General Dynamics-built LNG tanker will transport more than two billion feet of natural gas from Algeria to America's East Coast per trip.

Start of construction on the 125,000-cubic meter LNG tanker was signalled when Mrs. Blackwell welded her initials on a 98-ton keel section which was then lowered into the building basin.

See FIRST, Page 2

POMONA RECEIVES FOLLOW-ON AWARD

General Dynamics has received a follow-on contract from the U. S. Navy for approximately $59 million for additional production of the air-to-surface Standard ARM (antiradiation missile).

General Dynamics' Pomona Division will produce the Standard ARMs under a fixed-price-incentive-fee award from the Naval Air Systems Command. The air-launched missiles are being procured for both the Navy and the Air Force.

The missiles that will be built under the follow-on award will incorporate improved developments in the guidance section. These new developments and other modifications within the guidance package will give Standard ARM a wider application and increase the overall capabilities of the missile.

Standard ARM has been in production at Pomona since 1967. The missile is an air-to-ground version of the Navy's surface-to-surface Standard Missile and homes on radiation emitted by ground radar.

YF-16 Lightweight Fighter Taxies Out Before 10,000 at Fort Worth

General Dynamics' YF-16 lightweight fighter prototype was unveiled Dec. 13 before 10,000 onlookers at Convair Aerospace Division's Fort Worth operation.

Unlike the traditional hangar rollout, the sleek YF-16, sporting high-visibility red, white and blue test markings, taxied under its own power from the flight ramp to the speaker's platform. Phil Oestricher, Fort Worth engineering test pilot, was at the controls in the cockpit.

The YF-16 is a small, single-seat, single-engine air superiority aircraft optimized for high maneuverability during dogfights. It is the first aircraft completed under the U. S. Air Force's new advanced prototype approach to weapon system development.

The Honorable John L. McLucas, Secretary of the Air Force, was principal speaker at the rollout which occurred just 21 months after General Dynamics received a $37.9 million contract to produce two YF-16 aircraft for flight evaluation.

"Today marks an achievement that both the Air Force and General Dynamics can share with pride," McLucas said. "You isolated from normal company activities a select group of engineering and production people who could concentrate solely on designing and building the prototype. We are all impressed at

See YF-16, Page 2

Media Accolades for YF-16

Media comments following YF-16 rollout at Convair Aerospace Division's Fort Worth operation:

"A drastic turnabout in U. S. Air Force demands for bigger and bigger fighters has been demonstrated with General Dynamics unveiling the prototype of a 'compact' high-performance jet fighter." — *Dallas Times Herald.*

* * *

"The sleek red, white and blue aircraft, the sports car of a fighter fleet, taxied under its own power across the ramp, surprising even Dr. John L. McLucas, the Secretary of the Air Force. They gave the plane a standing ovation." — *United Press International.*

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"With a design combat weight of only 17,500 pounds and a single engine in the 25,000-pounds thrust range, the plane should accelerate twice as fast as the best fighters now in operational squadrons." — *Fort Worth Star Telegram.*

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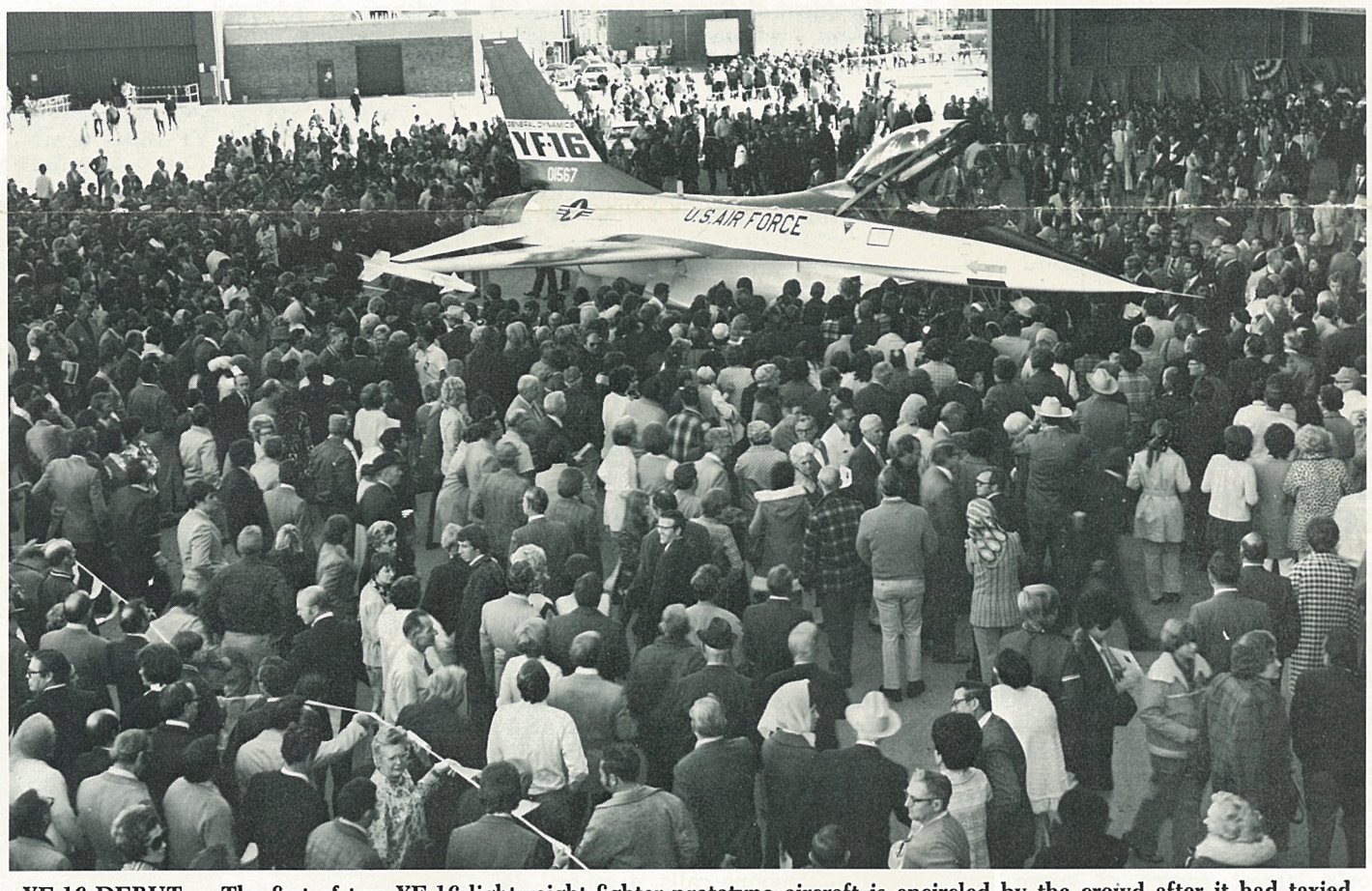
"Although the Air Force has said there will be no direct flight competition between the YF-16 and the Northrop YF-17, high-ranking officers are expected to choose one for production." — *Associated Press.*



YF-16 DEBUT — The first of two YF-16 lightweight fighter prototype aircraft is encircled by the crowd after it had taxied out last month at Fort Worth before 10,000 General Dynamics employes, their families and visiting dignitaries. First YF-16 will begin flight test program this month at Edwards Air Force Base in California.

'New York City' Keel Laid at Groton

NEW YORK CITY FIRST — Nuclear submarine keel laying at General Dynamics' shipyard in Groton, Ct., marked the start of construction of the first naval combatant ship named for New York City.

The keel for the *New York City,* fourth of the SSN-688 class of nuclear-powered, high-speed attack submarines to be built by General Dynamics was laid Dec. 15 at the Electric Boat Division.

Principal speaker at the keel laying was Senator James L. Buckley of New York. His wife Ann welded her initials into the 80-ton steel cylinder.

Buckley told the crowd of 4,000 that U. S. first line weapon systems rely on technology of an earlier generation and as a result the nation may be inviting "a technological Pearl Harbor."

"Weakness invites attack. Highest priority needs to be given to those elements of our defense that affect the viability of our deterrent forces," he said.

Designated SSN-696, the *New York City* like her sister ships will be 360 feet long and displace 6,900 tons.

WELL DONE — Principal speaker Honorable John L. McLucas, Secretary of the Air Force, left, commended General Dynamics for developing YF-16 ahead of schedule and under budgeted cost. David S. Lewis, Chairman, President and Chief Executive Officer of General Dynamics, holds post-rollout talk with McLucas.

Lightweight Tactical Units

Electronics Division Will Produce Ground Surveillance Radar Sets for Marine Corps

Production of 428 radar sets for the Marine Corps will start soon under a contract with the U. S. Army Electronics Command, Fort Monmouth, N. J., said J. N. MacInnes, Electronics Division product manager.

The ground surveillance units developed by General Dynamics have successfully completed field testing to prove out the operational and environmental characteristics of the lightweight tactical units.

Designated AN/PPS-15, the all-weather radar set is capable of detecting, locating, and identifying moving targets such as personnel, vehicles and boats, under conditions of limited or no visibility.

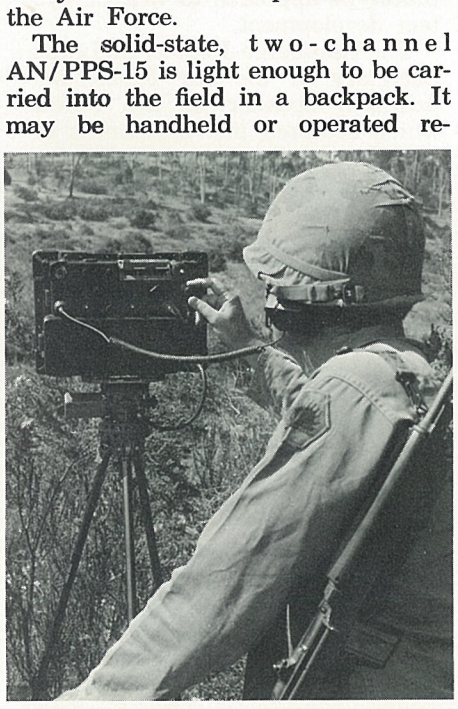
Electronics Division delivered 16 of the radar sets last June — 13 to the Army and Marine Corps and three to the Air Force.

The solid-state, two-channel AN/PPS-15 is light enough to be carried into the field in a backpack. It may be handheld or operated remotely, and presents specific target information and data both aurally and visually.

"Moving targets are detected audibly through a headset worn under the operator's helmet," MacInnes said. "The operator can be quickly trained to distinguish different targets because personnel, trucks, and tracked vehicles produce distinctive sounds in the earphones."

The radar set breaks down into an antenna unit and a control unit. The antenna unit remains on a scanning pedestal and tripod, while the control display element allows the operator to direct the radar from a foxhole or other protective cover.

Design and test of the AN/PPS-15 was done at the Electronics plant in San Diego under the direction of G. W. Eaton, program manager. Eaton will also direct production which will be carried out at the Orlando facility in Florida.



SURVEILLANCE RADAR — Application of AN/PPS-15 ground surveillance radar sets shows a Marine ranging target with tripod-mounted unit in close-coupled maneuver. The Orlando operation of Electronics Division will produce 428 of the lightweight tactical radar units for the U. S. Marine Corps.

TRI-JET SECTIONS — 55-foot C/D component, largest of three fuselage sections Convair-SD builds for McDonnell Douglas DC-10, is hoisted from fixture during assembly line move at Lindbergh Field plant. Convair has delivered more than 150 ship-sets each totaling approximately 128 feet when mated. As of last November McDonnell Douglas had orders for 199 and options for 37 of the DC-10 tri-jets from 30 airlines.

YF-16 Taxies Out Before 10,000...

Continued from Page One

the progress you have made."

He said the team has been well attuned to cost considerations because the YF-16 was developed not only ahead of schedule but under its budgeted cost.

David S. Lewis, Chairman, President and Chief Executive Officer of General Dynamics, was master of ceremonies and Frank W. Davis, President of Convair Aerospace Division, welcomed those attending. Congratulatory telegrams were read from Texas Senator John Tower and Congressman Jim Wright of Fort Worth.

Lyman C. Josephs, Vice President-YF-16 Program Director for Convair, described the YF-16 as a very high-performance fighter that will be unequaled by any other fighter in the world.

"It will give the pilot the feeling that he is not just riding in it, but is a part of it," he said.

To achieve small size and light weight with their inherent lower cost, several emerging technological advances were incorporated in the YF-16 design.

Forebody strakes were employed for vortex control; wing/body blending yields improved body lift and a simple fly-by-wire flight control system replaces mechanical linkages. Lift and maneuver efficiency is achieved by automatic leading edge flaps on the wing and a frameless, bubble canopy provides the pilot with unprecedented visibility.

In designing the YF-16, General Dynamics considered low cost to be a goal as important as performance and schedule, Josephs said. Design cost of the aircraft, for which no production commitment has been made, is $3 million in fiscal year 1972 dollars.

The YF-16 configuration and performance have been verified in a comprehensive wind tunnel testing program during the past year. Results show that performance will be well within the design goals in the key areas of acceleration, cruise speed and sustained turning radius.

An extensive flight test program is planned and first flight of the YF-16 is scheduled in January at Edwards Air Force Base in California. The second YF-16 will enter the flight test program later in 1974.

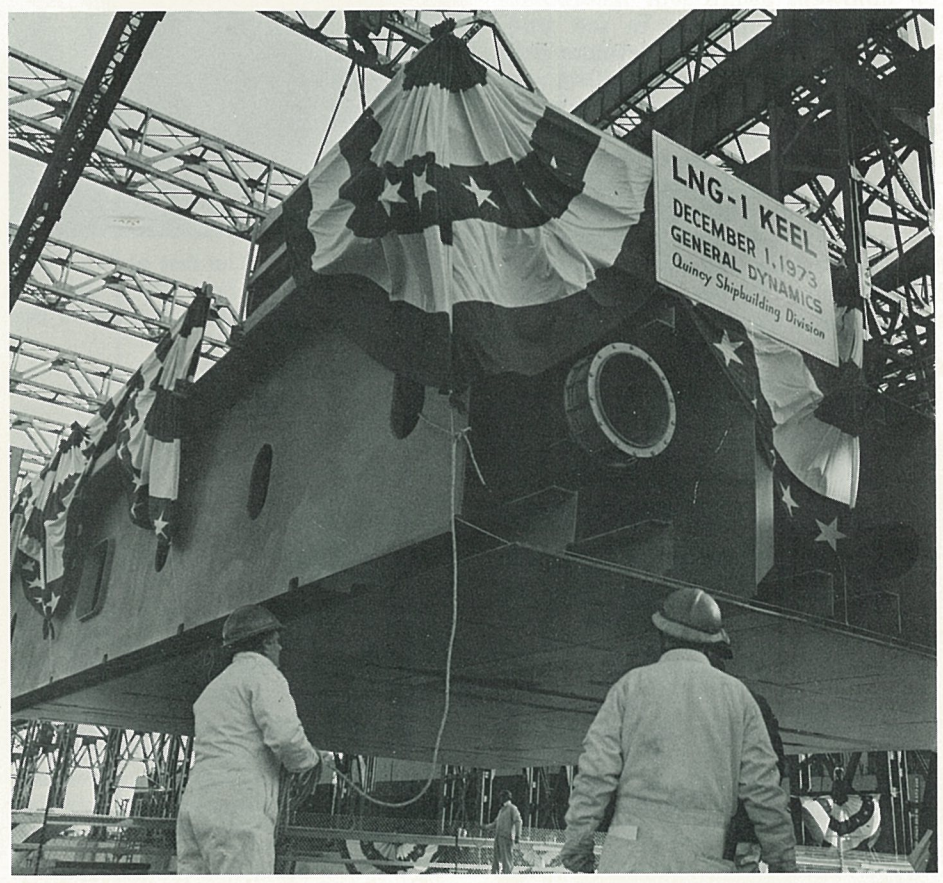
First LNG Keel Laid...

Continued from Page One

General Dynamics' Quincy Division has received contracts totalling $650 million for seven LNG tankers during the past year. All of the ships will use the Moss-Rosenberg containment design which incorporates five 120-foot diameter spheres containing natural gas liquefied at -265°F.

The first ship, scheduled for delivery in 1975, is being built for operation by Summit Marine Operations, Inc.

Others participating in the ceremony included Davis S. Lewis, Chairman, President and Chief Executive Officer of General Dynamics; Mrs. Helen D. Bentley, Chairman of the Federal Maritime Commission; Elias Kulukundis, President of Burmah Oil Tankers, Ltd. and P. Takis Veliotis, President of the Quincy Shipbuilding Division.



GIANT LNG CARRIER STARTED — A 98-ton keel was laid Dec. 1 marking start of construction of the nation's first giant 125,000-cubic-meter liquefied natural gas tanker at General Dynamic's Quincy (Mass.) shipyard. When it goes into service in 1975, the tanker will carry enough liquefied natural gas per trip to heat 70,000 homes during the winter.The tanker will transport gas from Algeria to the East Coast. General Dynamics has contracts to build seven.

S-C CROSSREED Switching System Serves EROS Data Center Facility

One of the busier telephone numbers in the United States these days is 605 594-6511. Dial that number and you'll be connected with an isolated, one-story concrete building located in the flat farmland northeast of Sioux Falls, South Dakota.

The building is the EROS (for Earth Resources Observation Systems) Data Center, a newly-constructed facility operated by the U.S. Geological Survey. It is also the nation's largest source of space and aerial photographs of the earth.

The EROS center, opened last July, is one of several Federal activities using new Stromberg-Carlson CROSSREED® telephone switching systems.

The popularity of the EROS telephone number can be traced to a basic service which the center provides. For the cost of a telephone call and the nominal sum of $1.75, any man, woman or child can obtain a 9" x 9" black and white photograph — taken by satellite or aircraft — of almost any place on earth.

Color enlargements, negatives or transparencies are also available on request, and since this service was announced in a privately-sponsored series of advertisements, the telephone in the 107,000-square foot building has been ringing around the clock.

Don Carney, an official at the center, said that calls jumped "at least 40 percent" since the first ads appeared last October.

Most of the requests, Carney says, are for imagery collected by NASA's Earth Resources Technology Satellite (ERTS), which photographs more than 80 percent of the earth from its near-polar orbit.

To handle the large number of incoming telephone calls, a central dispatcher transfers each caller to one of 11 specialists in earth sciences, cartography or some other expertise.

The center's 800-line capacity CROSSREED® system and 145 telephones make it easily the largest of the 1,464 customers of the Garretson (S.D.) Co-operative Telephone Association. Ralph Schreurs, general manager of the co-op since 1957, says that the expandable EPABX-800 was well suited to the EROS operation with its increasingly high traffic demands.

$41.9 Million Centaur Pact For Mission Support Services

Convair Aerospace Division's San Diego operation has received a $41.9 million two-year follow-on to the Centaur management and engineering support contract from NASA's Lewis Research Center.

The follow-on covers support services for the Atlas-Centaur and Titan-Centaur launch vehicles.

Under the award Convair-SD will continue to provide the support services required to assure successful mission accomplishment.

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Sanford Berns .... Editor

NORPAX Program

Ocean Data Buoy Relays Weather Trends

An ocean data buoy fabricated by the Electronics Division will play a significant role in a new oceanographic research program called the North Pacific Experiment (NORPAX).

The program may eventually lead to the improved long-range prediction of both the ocean environment and the weather around the world.

NORPAX is the outgrowth of an earlier research program called the North Pacific Study which utilized deep-moored, 100-ton data buoys developed by General Dynamics for the Office of Naval Research.

Ken Samples, NORPAX support program manager for Electronics Division, said that the Alpha buoy which was used in the North Pacific Study was redesigned and modified for the NORPAX program.

"The configuration of the mast was changed to facilitate on-station, at-sea exchange of sensors," he said. "Hardwire solid-state circuitry incorporating complex and sophisticated logic operating under low power makes up the electronics system."

The advantage of a low power electronics system permits an all-battery power source and eliminates engine driven generators, he said.

Alpha buoy left San Diego for Honolulu Jan. 7 aboard the Navy repair ship *Jason*. When Alpha arrives in Hawaii, the oceanographic research vessel *Thomas Washington* will tow the 40-foot-diameter, discus shaped buoy to a station 800 miles northeast of Honolulu. Alpha will be moored in 18,000 feet of water.

The first NORPAX field experiment will begin later this month in the North Central Pacific. It will last approximately one month and cover a 200-square-mile area of ocean.

Instruments aboard Alpha will provide data on winds, waves, along with atmospheric temperatures, pressures and humidity at the sea surface and below.

The experiments will mark the first time that such concentrated measurements have been attempted in the winter period when stormy weather conditions produce high wind velocities.

NORPAX is attempting only the first of many steps that will be necessary before prediction of long-term trends in weather can be appreciably improved.

The emphasis in the NORPAX program is in understanding the complex interaction between sea and air.

Alpha will stay on station unattended for one year. It is designed to telemeter its data long distances to a shore station on command.

A Mobile Data Center will be located at the Navy's Fleet Numerical Weather Center at Monterey, California to receive and analyze the data.

Elmer Gauthier was project manager for Alpha preparation; Ralph Kosic, project engineer for the sensor systems; and Jack Thayer is the chief operator of the Mobile Data Center.

NORPAX is jointly funded by the Office of Naval Research and the National Science Foundation.

The principal contractor is the Scripps Institution of Oceanography of the University of California, San Diego.

LINEUP — Nearly four miles of mooring line has been prepared by Electronics Division to secure reconfigured Alpha buoy on station during NORPAX program. Eight-strand nylon line is 1½-inches in diameter and stretches 20,000 feet. Checking mooring hardware prior to shipment to Hawaii is W. K. Barnett of Convair Aerospace Division.

Fort Worth, Pomona Associations Cited as 'Outstanding Chapters'

Management Associations at Convair-Fort Worth and Pomona Divisions were judged "outstanding company chapters" recently during the National Management Association convention in Denver, Colo.

Convair-FW was singled out for first place honors in the Group 1 category and Pomona won first in Group 2. Groups are determined by active membership.

Management Associations at Convair-SD, Electronics Division and Electric Boat also earned recognition at the convention.

Convair-SD was runner-up to Fort Worth in Group 1 and the Electronics Division placed second in Group 3. Excellent Club awards were handed out to Convair-FW, Convair-SD, Pomona, Electronics, and Electric Boat. Convair-FW and Convair-SD also received Superior Club honors.

Attending the NMA convention were:

John Campbell, Willard Johnson, Gene Garrett, Convair-FW; Chuck Mimbs, Larry Marino, John Baird, Pomona; Nick Fast, Leland Bishop, Bob Nickerson; Elissa Riozzi, Electric Boat; George DeBell, Dave Jenkins, Electronics-San Diego; Bob Ratliff, Chuck Simmons, Jess Cook, Don Evanson, John Stoffel, Bill Ochodnicky, Convair-SD; John J. O'Neill, Stromberg-Carlson, Rochester; George Cooper, Convair-Vandenberg; Lew Corwin, Corporate Headquarters.

Three Stromberg-Carlson Engineers Named to New Company Positions

Three Stromberg-Carlson engineers have been named to newly created positions in the company's research and engineering department.

Appointed were William Hastings, director of product design; J. Gordon Pearce, director of advanced development and systems planning; and Jack Shirman, director of monolithic laboratories and reed switch fabrication.

Hastings joined Stromberg-Carlson in 1957 as an engineer in the company's electronic switching section.

He has been responsible for development of a number of new electronic and electromechanical switching and related systems. Most recently, Hastings served as manager of switching design.

Pearce joined Stromberg-Carlson in 1956 as head of the company's electronic switching development section and subsequently held a variety of engineering management positions.

Prior to his new appointment, he was manager of systems planning. Before joining Stromberg-Carlson, Pearce spent 19 years with the Automatic Telephone and Electric Co., Ltd., in Liverpool, England.

Shirman joined Stromberg-Carlson in 1957 as a design engineer and has held a variety of engineering supervision and management positions.

In 1969 he was assigned to plan a new facility for development and production of proprietary integrated circuits. He has managed the facility's operation since its completion in 1970.

Shirman received his M.S. degree in electrical engineering from Cornell University and his M.B.A. from Rochester Institute of Technology.

EB Building $14 Million Fabrication Facility

A contract for approximately $14 million has been awarded to Gilbane Building Co. of Providence, R.I., to build a new submarine fabrication and assembly facility at Electric Boat Division.

The building, which will provide year-round weather protection for submarine fabrication and erection, will be 490 feet long and 260 feet wide and will be located south of the present North Yard building ways.

When completed, it will be similar in appearance to the four adjacent shipways at the shipyard.

Certified Through 1993

Service Lives Doubled for F-102 and F-106

Certified service lives for the delta-winged F-102 and F-106 have been doubled through extensive fatigue testing in an aircraft structural integrity program (ASIP) conducted by Convair Aerospace Division in San Diego.

B. F. Ferguson, Convair-SD F-102 and F-106 deputy program manager, said extension of the service life of the F-106 to 8,000 hours is equivalent to 32,000 hours of flight and certifies the longevity of the Delta Dart through 1993.

The ASIP effort began in 1970 when an F-106 was instrumented for flight loads surveys, Ferguson said. "As a result of the tests we revised the loads and strains data for fatigue damage analysis. These criteria along with those of past usage of the aircraft and pilot interviews, were combined to formulate the final test parameters."

The F-106 entered the cyclic fatigue facility early this year and was subjected to loads and stresses comparable to those that would be experienced in 32,000 hours of actual flying. Since certification to 8,000 hours, the aircraft has undergone major inspection and no significant structural failures have been noted.

Ferguson said the F-102 Delta Dagger has also been certified to 8,000 hours through similar tests.

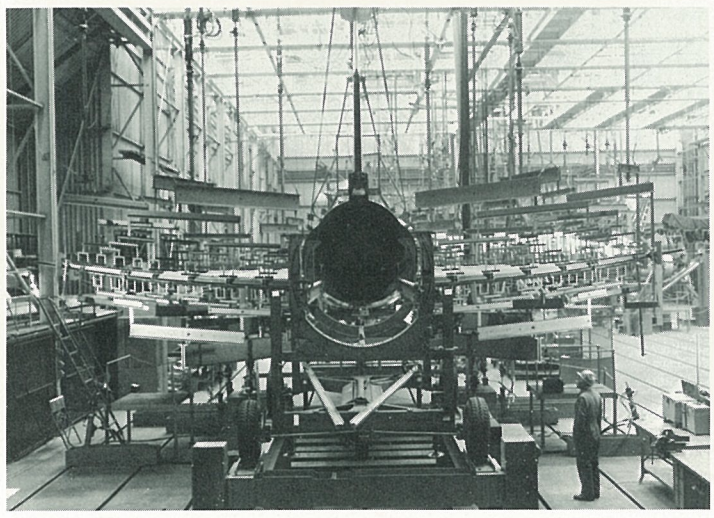
Coincident with certifying F-106 service life, a timely article by Capt. Donald D. Carson, USAF, entitled "Flying the Six" appears in the October issue of Air Force Magazine. Capt. Carson describes what it is like to fly the F-106 in both intercept and air-superiority roles.

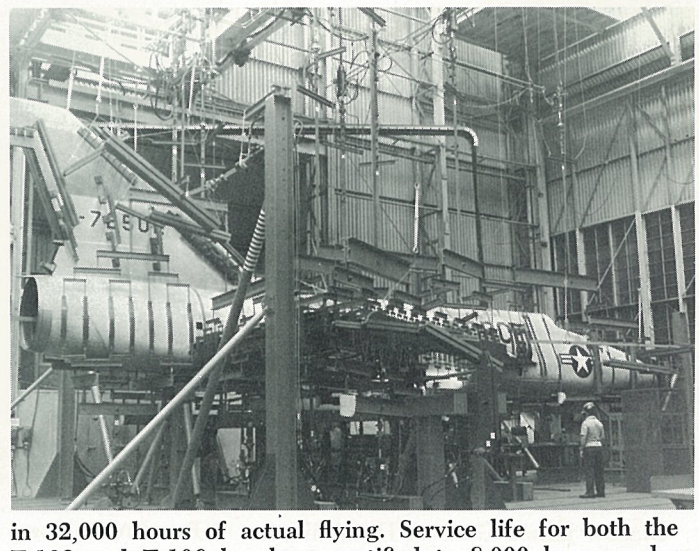
"After fifteen years of hard use, the men who fly the F-106 Delta Dart think it has improved with age," says Capt. Carson. "Many say the 'Six' is one of the truly great airframe designs of modern aviation."

Capt. Carson says there are many good years left for the F-106 because it can perform its mission far better today than it could when introduced in 1959 because the systems have been continually refined. "With renewed interest and increased emphasis on upgrading the F-106, it will be around for many years to come," he said.

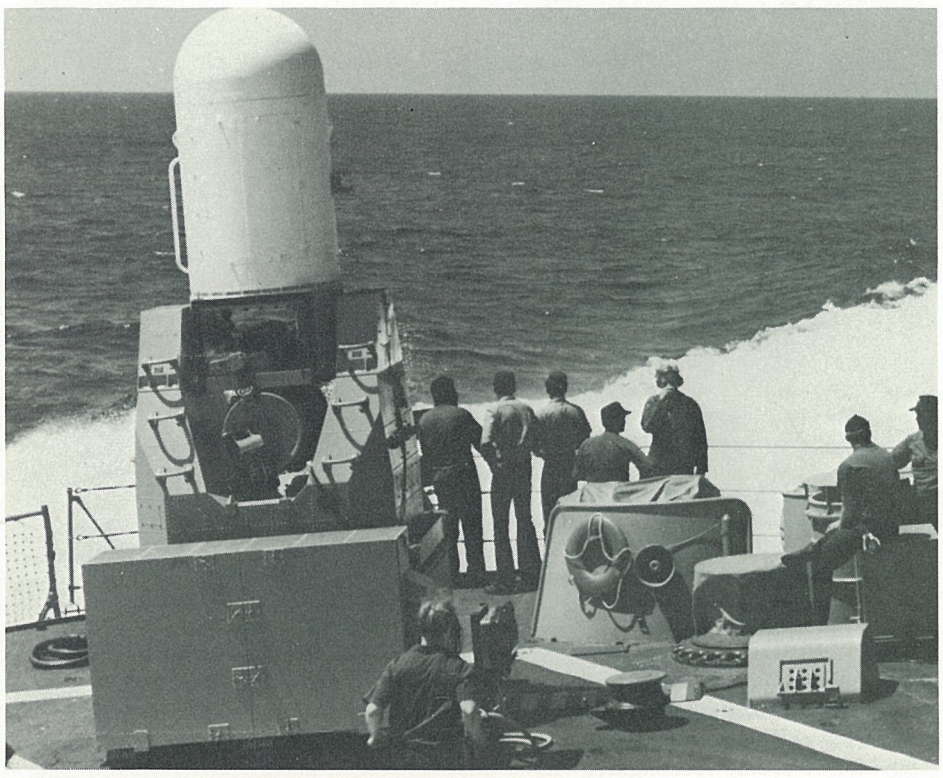
According to Ferguson, 1,000 F-102s and 342 F-106s were built by Convair-SD. The Air National Guard is flying 12 squadrons of F-102s and four squadrons of F-106s.

The Aerospace Defense Command has seven operational F-106 squadrons.





LONGER LIFE — Technician monitors structural testing of F-102, left, in cyclic fatigue facility. Delta wing of aircraft is under seven-g load. Structural testing of F-106, right, involved loads and stresses comparable to those experienced in 32,000 hours of actual flying. Service life for both the F-102 and F-106 has been certified to 8,000 hours under aircraft structural integrity program carried out at Convair Aerospace Division in San Diego.



ON TARGET — The effectiveness of the Phalanx Close-In Weapons System against low flying targets was demonstrated during firings from the USS King off the West Coast. Targets were hit and destroyed by a special type of ammunition designed for Phalanx.

Phalanx Shipboard Firings Successful

General Dynamics' Phalanx Close-In Weapon System recently demonstrated its effectiveness against low-flying targets during initial shipboard firings off the West Coast.

The Phalanx is a new generation gun defense system designed to protect combatants against attacks by missiles or low-flying aircraft. It is under development for the Navy by the Pomona Division.

"Our successes to date with the Phalanx program have been outstanding," said J. E. McSweeny, Pomona program director. "During firings from the *USS King,* Phalanx detected targets, processed target information, handed the target over from search to track, and controlled firing from the first engagement range in the inner boundary, all automatically. The system performed as planned and destroyed five targets in five attempts."

The Close-In Weapon System employs a six-barrel, rapid-firing Gatling gun which fires and corrects its aim automatically after the computer-controlled Phalanx acquires and is tracking the target. It is geared to very high kill probability in a short time of engagement.

Before the actual target firings from the *King,* Phalanx was put through exhaustive tests. Electromagnetic interference generated from radars, sonars, and communications systems aboard the *King* and other ships in the area did not impede the performance of Phalanx. During tracking experiments the system repeatedly detected and tracked slow as well as high-performance aerial targets and, for the first time, fired on surface objects.

Firings were carried out from dawn to dusk under varied sea conditions. Targets were hit and destroyed by a special type of ammunition designed for Phalanx. The round features a nylon sabot which separates when the projectile leaves the barrel. The depleted uranium penetrator is effective against the target because of its density and high-velocity.

Phalanx hardware was installed aboard the *King* in one day and power applied to the system within four days, proving that the modular design combining fire control and gun mount into a single structure will facilitate rapid installation on a wide variety of combatant ships.

The program has completed contractor technical evaluation and the Navy has accepted delivery of the equipment for the Navy technical evaluation phase. The development is under the cognizance of the U. S. Naval Ordnance Systems Command.

NAVY AWARDS $11.3 MILLION TO POMONA DIVISION FOR STANDARD ACTIVE PRODUCTION

Pomona Division will build 18 Standard Active surface-to-surface missiles under an $11.3 million follow-on contract from the U. S. Navy.

The funding is for the continued development of Standard Active as it enters the test and evaluation phase of the program.

Missile firings from Navy combatants will begin next year against tactical type targets. Initial tests will be conducted by the Navy/Contractor team followed by independent Navy testing of 10 of the missiles.

Standard Active is an outgrowth of the Standard Missile-1 now in production at Pomona. Standard Active uses the SM-1 airframe and a more sophisticated guidance section to seek and engage surface targets over the horizon. The major new element of the guidance package is a coherent pulse doppler active radar developed by Raytheon Missile Systems Division.

Pomona recently completed initial flight tests of three Standard Active missiles for the Navy. Each was fired from the *USS Hoel* at the Pacific Missile Range. All flights were highly successful, scoring direct hits against targets over the horizon.

The first firing in April marked the Navy's initial use of an active guidance section in a surface-to-surface application.

A Defense System Acquisition Review Council has reviewed the program and approved continued in-depth evaluation to establish production readiness.

Standard Active development is under the cognizance of the U. S. Naval Ordnance Systems Command.

DatagraphiX to Build ASW Displays for Navy

Stromberg DatagraphiX has received a $3.2 million contract for production of tactical antisubmarine warfare display systems and ancillary equipment for the U. S. Navy.

DatagraphiX will fabricate 12 shipsets under the award from the Naval Air Systems Command. Designated AN/ASA-70, the display systems incorporate the CHARACTRON® Shaped Beam Tube and are major components of the A-NEW antisubmarine warfare system flying aboard U. S. Navy P-3C aircraft.

A shipset is made up of a 16-inch display console for the tactical coordinator, another 16-inch display for the sensor operator, two seven-inch auxiliary readout displays and power supplies for each.

Production will be done at DatagraphiX' manufacturing facility in El Cajon, Calif.

DatagraphiX Enters Printing Market With System 7000 Platemaker

Stromberg DatagraphiX, has entered the printing market with the introduction of the System 7000 Platemaker.

The System 7000 is an automatic platemaking system which uses microfilm from a COM recorder, phototypesetter or source document camera without the need for costly stripping or opaqueing operations.

The platemaker projects full-sized images directly from microfilm onto Datalith® silver emulsion plates at speeds up to twelve 9″x12″ plates per minute. Up to 5,000 copies may be duplicated from each plate.

The fully automatic processor requires no special plumbing and processes plates at 166 linear inches per minute. The optional plate dryer allows plates to be stacked and temporarily stored for later press runs.

The solid-state electronic control system provides the flexibility for one-, two- or four-up plates in a variety of signatures to accommodate press room and binder operations. Controls for setup and manual, semiautomatic and fully automatic operation are easily accessible.

The System 7000 will be supported by the DatagraphiX worldwide sales and service organization.

V/STOL BRIEFING — Naval officers from the Pacific Fleet visited Convair-SD recently for overview of Model 200 V/STOL, Model 201 CTOL and Model 84 aircraft. Radm. N. P. Foss, Commander Training Pacific Fleet and Radm. F. H. Baughman, Force Material Officer, Naval Air Forces Pacific, observe instruction being given by Dave Wheaton, Convair-SD, to Vadm. R. B. Baldwin, Commander Naval Air Forces Pacific, in Model 200 mock-up. Officers also toured mock-up facility and "flew" the V/STOL point-light source flight simulator.

C. G. Schutz Named to S-C Employment Post

Charles G. Schutz has joined Stromberg-Carlson Corporation as manager of employment and community relations.

Schutz was previously with General Dynamics' Pomona Division where he served as personnel administrator and salaried compensation administrator.

He joined General Dynamics in 1961 as senior placement representative for the Convair Aerospace Division in San Diego and has held a variety of industrial relations positions at Pomona and Convair. From 1968 to 1970 he was assigned to General Dynamics' corporate headquarters as manager of college relations.

Schutz is a native of Gloversville, N.Y., and majored in business administration at the University of Syracuse and UCLA.

Glasser Now VP-International

Otto J. Glasser has been elected Vice-President-International of General Dynamics, David S. Lewis, Chairman, President and Chief Executive Officer, announced.

Glasser joined General Dynamics in September as Deputy Director-International after retiring from the Air Force as a lieutenant general.

NEW SYMBOL — Stromberg-Carlson Communications introduced this symbol to the public in conjunction with its recent move into permanent headquarters at Corporate Square in St. Louis. SCC's exhibit at the recent San Diego Tele-Communications Association Conference, which included extensive use of the new symbol, was judged second best of more than 100 displays. The first SCC advertisement in a new campaign appeared in local and regional trade publications in October.

Peter Goetz Appointed At Electro Dynamic

Peter B. Goetz has been named Manager of General Dynamics' Electro Dynamic Division.

Goetz, who has been with Electro Dynamic nine years, will report to Gene K. Beare, President of General Dynamics Commercial Products Company and an Executive Vice President of the corporation.

A 1957 engineering graduate of Villanova University, Goetz joined the division as a design engineer, and after serving in a number of engineering management positions was named Director of Engineering in March, 1971.

He is a native of Staten Island, N.Y., and served as a lieutenant in the U.S. Coast Guard from 1957 to 1960.

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Data Processing Functions to Be Consolidated

By early 1975, all data processing functions within GD will be centralized into a single department encompassing four district Data Systems Centers.

This new system, using standardized computers and common data language, will allow for an exchange of information among the company's operating units, resulting in considerable reduction in costs and improvement in service.

The pooling of overall data processing resources, including the sharing of hardware and language programs, will afford more processing power per dollar for administrative, engineering and scientific departments.

The four Data Systems Centers (Western, Central, Eastern and Canadian) will be located in San Diego, Fort Worth, Groton and Montreal.

Melville Barlow, Corporate Director of Data Systems Services, said headquarters for the organization, now in San Diego, will be moved to St. Louis when the Centers become operational.

GD's data processing needs will then be handled by a total of ten computers at the four sites — instead of the 24 computers now located at 16 company offices.

Access to the computers will be through terminals at divisions and subsidiaries serviced by each of the geographically located centers.

The consolidation of the data processing function will require a standardization, now in progress, of all the codes, symbols and alphanumeric characters used in computer programming.

These specifications will provide a uniform set of corporate standards to allow the free movement of information and programs between divisions.

Teleprocessing equipment to transmit data between two or more locations will permit the computers at the various centers to communicate with each other.

All installations will also have a back-up computer capability in the event of a primary system failure.

It is estimated that the corporation's

See CONSOLIDATION, Page 5

ANNUAL MEETING

Quarter Sales/Net Up; Expansion Set

Speaking at the company's Annual Shareholders' Meeting, David S. Lewis, Chairman and Chief Executive Officer, said net earnings for the quarter ending March 31, 1974, were $8,629,000, or 82 cents per common share, on sales of $414,772,000.

Net earnings for the first quarter of 1973 were $7,366,000, or 70 cents per share, on sales of $398,033,000.

"Our company is healthy, we have excellent prospects for the future, and we look for 1974 to be a better year than 1973," he said.

Sales for the year should be higher than a year earlier and "it should not be too long before we are again in the $2-billion-a-year sales category."

To attain and exceed this sales level, and achieve company earnings objectives, GD will invest more than $300 million, over the next three years, in new plants and equipment and normal replacement items, he said.

This will be in addition to the $53 million spent for similar purposes in 1973 and represents the largest facilities expansion program in GD's history.

The company plans to finance this capital improvement program through cash flow generated in the business and through short-term borrowing. "We do not intend to shackle our company's future with long-term financing at today's exaggerated interest rates."

David S. Lewis, at lectern, addresses shareholders at the annual meeting in St. Louis. Seated at table from left: John P. Maguire, Secretary; Henry Crown, Executive Committee Chairman; Gorden E. MacDonald, Executive Vice President-Finance.

The largest number of facilities dollars will be spent at Electric Boat, where the company has major contracts for submarine production and overhaul.

For Chairman's Complete Text, See Page 3

In addition to improvements at the main shipyard, Lewis said the company has been working with the State of Rhode Island to lease portions of the recently decommissioned Quonset Point Naval Air Station for use as a production support facility.

A $40 million modification and refurbishment program at Quincy Shipbuilding is already well under way.

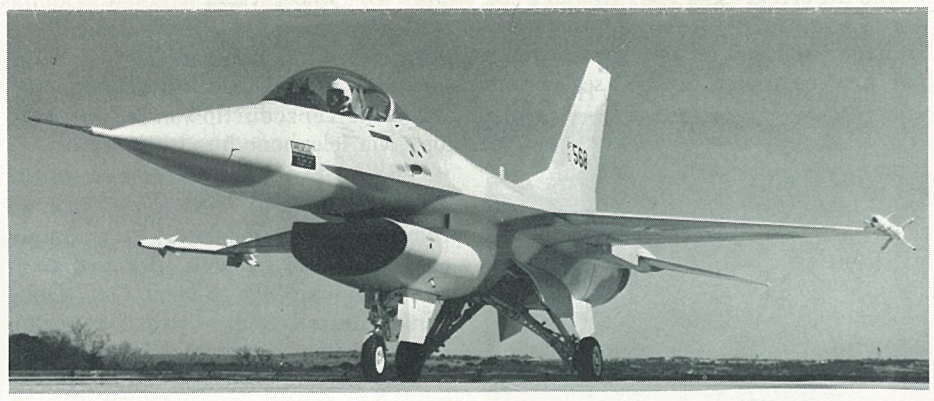
The Quincy yard, which the company once considered closing, now has contracts worth more than $650 million for the construction of seven liquefied natural gas tankers and expects to receive a contract for the eighth shortly, he said.

Shareholders elected two new Board Members — James M. Beggs, Executive Vice President-Aerospace and Lester Crown, President/Chief Executive Officer of Material Service Corp.

Beggs, who joined GD in January, is a former vice president and managing director of Summa Corp. He had an outstanding career in government, including service as associate administrator of NASA and as Under Secretary of the U.S. Department of Transportation.

Crown's association with Material Service began in the early 1950s. He has served as director of Marblehead Lime and United Electric Coal, two principal units of the MS group. He is

See EXPANSION, Page 5



POISED TO PERFORM — YF-16 Prototype Two, painted a distinctive camouflage pattern of sky blue and cloud white, at the ready, prior to its first successful flight, May 9, at Edwards AFB. The number one YF-16, marked in red, white and blue test colors, has amassed more than 50 hours of flying time, since its first full-scale test flight on February 2, including more than 2½ hours at supersonic speed.

26 82

Major Facilities Program at EB

A major new submarine construction launch complex at Electric Boat, expected to be fully operational by 1976 and costing more than $72 million, will enable the division to erect the largest submarines presently envisioned.

Included will be a fabrication facility featuring an unusual $30 million pontoon graving dock, or ship building basin, developed by EB engineers.

"The pontoon principle represents an outstanding advancement in the construction of submarines," Joseph D. Pierce, General Manager, said.

This graving dock, believed to be the first of its kind, will be approximately 583 feet long and 102 feet wide. A pontoon platform, within the dock, will be used to launch submarines. The graving dock can also be used for drydocking service.

Sections of submarines will be constructed and assembled in an all-weather manufacturing area near the graving dock. The assembled sections will then be conveyed onto the pontoon launching platform.

Further sizable expansion of production facilities is contemplated over the next two years at EB, he added, if the competition to build the lead submarine for the new Trident class is won by GD

An extensive facilities expansion and modernization program is also underway at Quincy Shipbuilding.

S-C Voice/Video System for Asian Heart Center

Stromberg-Carlson has received an $869,000 contract to provide an integrated voice and video telecommunications system for the new Heart Center for Asia, now under construction in Quezon City, Philippines. The system will include 40 VISTAPHONE® units, an 800-line CROSSREED® E-800 matrix, 800 TONE-DIAL® pushbutton telephones and several key telephone systems.

The $15 million Heart Center for Asia will serve as a facility for heart research and education as well as for the treatment of heart disorders.

It will contain a nursing care unit with 150 single bedrooms equipped with heart monitoring devices. In addition, there will be emergency and observation rooms, operating rooms and an intensive care unit.

S-C's VISTAPHONE picture telephones, which are equipped with both wide-angle and "zoom" capability, will be interconnected through the switching system, making each video unit accessible from any other VISTAPHONE station, and will be used in a variety of applications.

These units will allow remote viewing of X rays, charts and patient records, as well as permit medical consultation and other administrative applications.

They will be located at nursing stations, in record centers, classrooms, laboratories and administrative offices.

The Center's communications system will contain a number of standard and optional features of the CROSSREED system, including conference calling, consultation calls, dial transfer and abbreviated dialing.

Special one-digit numbers will permit

See ASIAN, Page 4

Cowen, Starr Named Staff Vice Presidents

The title of Staff Vice President has been established to give appropriate recognition to certain corporate executives, David S. Lewis, Chairman and Chief Executive Officer, announced.

Philip R. Cowen and Sterling V. Starr are the first of such appointments.

Cowen was named Staff Vice President-Financial Analysis and Starr Staff Vice President-Corporate Planning.

Cowen joined the company in 1970 as assistant director of corporate accounting. He became director of corporate accounting later that year and, in 1973, was named corporate director-financial planning and control.

A graduate of New York University, Cowen, formerly, was an audit manager with Arthur Andersen & Co.

Starr has been with GD since 1953,

Philip R. Cowen

Sterling V. Starr

when he joined Convair-SD as an engineer.

He held a number of increasingly responsible positions at Convair, becoming advanced program manager in 1969. In 1970, he was named director of planning at corporate headquarters.

Starr is a graduate of Ohio State University.

Scholarships To Students

Six National Merit four-year scholarships and two Special Merit $1,000 grants have been awarded by General Dynamics to 1974 high school honor students.

The sons of four GD employes were declared National Merit Scholars and each received four-year scholarships. Students, colleges and careers are: John Hopkins, Texas Christian, mathematician, father — Ralph Hopkins, Convair-FW; Joseph Peters, Williams College, scientist, father — Raymond Peters, EB; Frank Minando, Calif. Tech., engineer, father — William Minando, Convair-SD; Richard Brady, Arizona U., astronomer, father — William Brady, S-C Corp.

Two outstanding minority honor students were recognized and awarded four-year Achievement Scholarships: Jacquelyn Evans of Chicago, to enter Boston U., accountant; Donald Williams of Vallejo, Calif., U. of Calif., engineer.

The $1,000 Special Merit Scholarships were awarded to: Mary Hiatt, of San Rafael, Calif., to attend M.I.T., engineer; Mark Schumacher, Dallas, to enter Harvard, business.

Since 1969, GD has contributed to the careers of 55 honor students, including: 32 Merit, 12 Achievement, and 11 Special Merit scholars.

These students were all selected from among those foremost in rank in qualifying tests during their junior year in high school.

Employes' sons or daughters who might be eligible are urged to take the appropriate tests.

Women Receive Cash Awards At Convair-FW

Two women employes of Convair-FW were declared high honor winners and received top cash awards for their contributions to the 1973 Suggestion Program.

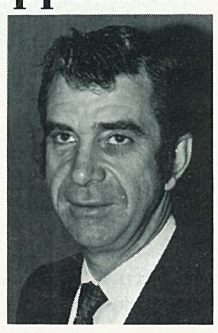
R. E. Adams, Vice President/General Manager of Convair-FW, presented citations from the National Association of Suggestion Systems to Virginia Fisher, salaried payroll, and Ann Long, hourly payroll, for their useful suggestions.

Virginia Fisher received the grand sum of $4,214 for a suggestion concerning the centralization of parts and supplies substores. Ann Long received $935 for a suggestion that recommended the use of wide-area telephone service, instead of telegrams, when hotel reservations are requested.

SUGGESTIONS PAY OFF — R. E. Adams presents cash awards to Ann Long, left, and Virginia Fisher for their ideas.

In 1973, 572 Convair-FW employes were awarded $93,105, in varying amounts, as prizes for worthwhile ideas. These suggestions are credited for an annual saving of $2,054,934, at the operation.

Redmond Appointed Director - Research



John C. Redmond

Dr. John C. Redmond has been named Corporate Director - Research and Advanced Development.

Redmond, who had been with Convair-FW since 1962, will report to Sterling V. Starr, Staff Vice President.

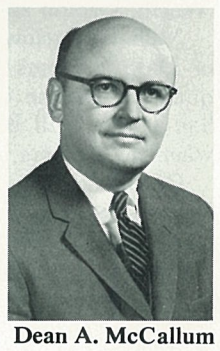
His responsibilities will include the direction, coordination and review of all operating unit research and new product development activity. He will also be responsible for contracted R&D programs.

Redmond's most recent position at Fort Worth was manager of independent research and development programs. His previous assignments included chief of applied research and research scientist.

A native of Chicago, he holds a B.S. degree in engineering from the University of North Dakota and received a Ph.D. in geophysics from Pennsylvania State University in 1962.

McCallum Appointed An Assistant Counsel

Dean A. McCallum has joined General Dynamics Corporation as Assistant General Counsel, the company announced.



Dean A. McCallum

McCallum, who has been assistant general counsel for Exxon Chemical Co. U.S.A. in New York and Houston, Tex., since 1970, will report to Edward E. Lynn, Vice President and General Counsel of the company.

Prior to joining Exxon, he was an attorney with its affiliate, Humble Oil & Refining Co., from 1962 to 1970. From 1956 to 1962 he was associated with a law firm in Hartford, Conn.

A native of Boston, Mass., McCallum is a graduate of Trinity College, where he received a B.A. degree in economics. He is also a graduate of Yale Law School.

COMMUNICATIONS CONFERENCE

Data Processing/Facsimile Network Featured

Representatives from ten GD divisions and subsidiaries attended a two-day day communications conference at corporate headquarters, recently.

The informal sessions, directed by Walt Long, Corporate Communications Manager, focused on the corporation's four new computer centers (see related story, p. 1) and a new national facsimile network that will be installed soon.

Facsimile transceivers are used for communication between locations, and allow the reproduction of actual page copy, via telephone line transmission.

The operations represented and the personnel who attended were: Asbestos Limited — C. Saunders; Canadair Limited — Theresa Gooden, Bernard Langlois; Convair-SD — Herb Day, Doug Zink; Electric Boat — Jim Hennegan, Dave Suydam; Electronics-SD — Naomi Adams, Ferris Bell; Electronics-Orlando, Fla. — Jerry Geiger; Stromberg-Carlson, Rochester, N.Y. — Walt Muller; S-C Sanford, Fla. — Bob Morrison; Material Service Corp. — Chicago, Paul Cuvala, Lou Levy; Pomona Division — Betty Garrison, Richard Hughes, Dan Johnson; Quincy Shipbuilding — I.L. 'Skip' Souza; Washington, D.C. — Carl Warren; and Frank Kimmel, Corporate Manager Industrial Engineering.

COMMUNICATORS — Standing from left, Herb Day, Doug Zink, Ferris Bell, C. Saunders, Dan Johnson, Paul Cuvala, Lou Levy, Carl Warren, Frank Kimmel, Bob Morrison, Richard Hughes, Dave Suydam, Walt Long, Jim Hennegan, Jerry Geiger. Seated from left, 'Skip' Souza, Theresa Gooden, Betty Garrison, Naomi Adams, Bernard Langlois, Walt Muller.

Movie by Convair S-D Wins 'Indy' Award

"All Systems Go," a film produced by Convair-SD's motion picture and television department, has won the coveted "Indy" award in the 1973 Industrial Photography Film Competition.

R. B. Montague, chief of motion pictures and TV for Convair-SD, said the film won the award in the Public Relations category of the annual competition in New York City. It marked the fifth time in the past ten years that Convair - SD came away with an "Indy" award.

Montague said that one judge evaluating the films said the entry was "about the only film to incorporate modern and non-narrative techniques" designed to be shown with two projectors and screens simultaneously.

The twin film with stereo sound tracks was designed and produced for last year's General Dynamics exhibit at the Transpo Exposition in Washington, D.C.

Over the past 15 years the motion picture and television department at Convair-SD has taken nearly 100 major awards for films entered in national and international film competitions.

TOP PRIZE — P. Takis Veliotis, President/General Manager Quincy Shipbuilding, right, presents $5000 maximum award to Frederick Rolfe, chief of hull design, for his solution to an involved elevator problem on the Lykes cargo ships.

Freeman Coal Mining Opens Deep Producer

Freeman Coal Mining Co., a GD subsidiary, will open a new underground coal mine in central Illinois with a potential production of three million tons per year and a planned initial yearly output of two million tons.

The new mine, to be named Crown No. 2, will be one of four Freeman mines in Illinois.

It will be located in Macoupin County, approximately 25 miles south of Springfield.

Work will begin this month, and the mine is expected to be in full production by January, 1977.

It will be the first new underground coal mine begun in Illinois in the last four years, and will include the most modern safety and production equipment available.

A substantial portion of the mine's production will be sold under long-term contract to the Central Illinois Light Co. for use at its plant in Fulton County, about 120 miles from the mine.

EB Going Overseas To Refit Submarines

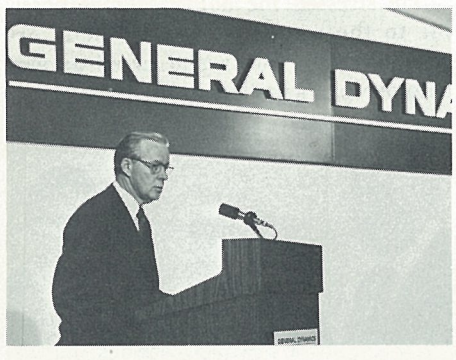
Electric Boat, the Navy says, will send employes overseas later this year to perform extended refits to submarines.

The job will involve more than one hundred EB craftsmen, who will complete "major maintenance tasks that are required to enable the ships to operate for longer periods between regular shipyard overhauls."

"During this extended refit," the Navy explained, "the work accomplished will be that normally done at the time of a shipyard overhaul." The work is beyond the capacity of submarine and tender crews, the Navy said.

THANKS EB — Alfred P. Ricci, Connecticut Red Cross Blood Program Administrator, left, presents plaque to George W. Roos, Director of Industrial Relations/Management Engineering at Electric Boat, in appreciation for 23 years of active participation by the division. EB employes have donated 22,000 pints of blood since its inception.

GD Has 'Quite A Different Personality' Today



David S. Lewis

Remarks of David S. Lewis, Chairman/Chief Executive Officer Of General Dynamics Corporation, At Annual Shareholders Meeting, In St. Louis, May 1, 1974

I would like to comment briefly on the general condition of the company rather than discuss the status of our major programs. I hope that you will take the opportunity to read our report since it contains significant data important to the company's future.

We do want to talk a little about one program — the YF-16 lightweight fighter. In the 43 flights made since its first in early February, the performance and handling qualities of the YF-16 have been evaluated through a very large portion of its flight envelope. The results have been most encouraging. It appears that our Fort Worth people have designed and built a superb airplane.

YF-16 Potential

As you remember, the YF-16 and the Northrop YF-17 were bought by the U.S. Air Force as "advanced technology prototypes" and there was no plan for either of these aircraft to go into production. This has gradually changed as the great value of the lightweight fighter has become better appreciated and there is now a very real and increasing interest by the Air Force in the possible procurement of a low-cost, high-performance fighter aircraft.

Indicative of this interest is the following news release carried on the UPI wires only two days ago:

"The Pentagon has told Congress it plans to push ahead with another brand new fighter plane — this time a smaller, less sophisticated and cheaper aircraft than the Air Force has usually built.

"The decision is expected to bring hundreds of millions of dollars to either General Dynamics Corporation of Fort Worth, Texas, or Northrop Corporation of Hawthorne, California, which have built experimental prototypes called the YF-16 and YF-17.

"Defense Secretary James Schlesinger wrote the chairmen of the four congressional committees that oversee the Pentagon saying current flight tests 'should permit us to select the more promising of the two.' The letter, written Saturday and released today at the Pentagon, said no final decision had been made to mass produce the one selected but Schlesinger said he was 'convinced' of the need of a lower cost fighter."

So we see that the YF-16 does indeed have the potential of becoming a major General Dynamics program with sales to the air forces of this country and those of our allies sometime in the future.

Now, I would like to talk to you about the general condition of General Dynamics as a whole, and share with you our views of where we are and where we are going.

Without question, our company has come a long way in the past three years. Beginning in early 1971, we started a program to strengthen our management team and our organization from top to bottom and to establish workable financial and operating procedures that would insure control of this highly complex company.

Different Company

This is a very different company today. While the backbone of General Dynamics — the tens of thousands of men and women in our divisions and subsidiaries — remains largely the same, it is significant to note that:

- Seven of the 11 top officers in our corporate headquarters have joined our company from other companies with histories of profitable operations.
- Six of our 14 divisions and subsidiaries have different general managers and all of them have stronger management at lower levels.

It is not generally understood, but it is a fact, that different companies have different "personalities," even though there are great similarities in organization charts, operating procedures, and so forth. A company gains its personality from the goals, attitudes, priorities and, most of all, from the business principles established by its leaders.

There is no question in my mind that General Dynamics has quite a different personality today than it had in 1970. Today we have a management team at the divisions and in the corporate office that share a common determination to provide outstanding products and services to our customers — but only on a fair and profitable basis and with a fair return for our shareholders.

But, no matter how determined we are, our goals will not be met unless each of our managers:

- understands his operation in detail;
- accurately evaluates the strengths and weaknesses of his key people and willingly makes the difficult personnel changes required to develop a more creative, dynamic and effective organization;
- accepts new business only when it can be obtained on a profitable basis, no matter how attractive it might otherwise be;
- continually strives for increased productivity with rigid cost control disciplines;
- and places high priority on long-term planning for growth in the years and decades ahead.

Certainly we have a long way to go in each of those important areas. But we have already made real progress:

- Each of our divisions and subsidiaries is profitable.
- Each of our divisions and subsidiaries is convinced that it can be more profitable.
- Each of our divisions and subsidiaries has good prospects for future growth — and all of their effort has led to the highest backlog in the company's history.

1973 saw the end of the steady downward slide in annual sales after our peak year of 1968. Sales this year will be higher than last and it should not be too long before we are again in the $2-billion-a-year sales category. Also of great importance is the fact that the total jobs provided by our company increased in 1973 and should increase again this year.

All of the things I have talked about are encouraging. They indicate that General Dynamics is now in a strong position for steady growth in sales and earnings in the years ahead.

I believe that is a fair summary of where we stand today; however, I know that our company faces a number of difficult problems which must be solved successfully if we are to capitalize on the opportunities available to us.

Facilities Expansion

First of all, we are well along in the largest facilities expansion program in the history of the company. Last year we spent more than $53 million to pay for new plants and equipment plus normal replacement items, and we expect to spend nearly $300 million more for these purposes over the next three years. It is extremely important that these facility programs be carried out expeditiously without undue interference with our on-going operations, that we build only what we really need and that we get a dollar's worth of additional earnings capacity for every dollar spent.

Far and away the largest number of facility dollars will be spent by Electric Boat as it prepares to meet its long-term commitments for submarine production and overhaul work. In an effort to reduce the total capital requirements, we are working with the State of Rhode Island to lease some very excellent buildings which are a part of the Quonset Point Naval Air Station, soon to be transferred to the state. While substantial funds will be required to make the Quonset facilities suitable for subassembly and parts manufacturing, the great majority of our dollars will be spent in the Electric Boat shipyard at Groton. Both of these facility programs must be carried out with careful planning to prevent interference with the intensive on-going production programs which form the bow wave of Electric Boat's $1.6 billion backlog.

We plan to spend substantial sums to add capability and to up-grade our commercial operations, particularly our coal mines and our materials and telecommunications companies.

We are well into the $40 million modification and refurbishment program at the Quincy shipyard. These improvements are required to enable Quincy to build its giant LNG ships efficiently. So far, this program has gone well and when it is completed, Quincy could be a truly competitive yard — from the facilities standpoint.

LNG Backlog

Now, with new facilities coming along, we are ready to go with a backlog of $650 million for seven ships — with a contract for the eighth expected shortly. However, for the past six weeks, the principal production union at Quincy has been on strike. The basic issues in the controversy are not only the normal ones involving wages, fringe benefits, cost of living, etc. But, more importantly, our problems arise from the company's determination to eliminate a number of very unfortunate and inefficient work practices which have evolved over the years, most of them before the yard was owned by General Dynamics.

These issues concern terribly inefficient jurisdictional arrangements: the union's insistence that the company pay full wages to a large number of union stewards who are not required to do any useful work — and several other time-wasting practices which help no one. We are convinced that our workers in the Quincy shipyard are fully qualified and are eager to do a full day's work for a fair full day's pay. But until conditions are changed to allow these people to perform as they are able to, the Quincy shipyard will not be competitive.

If Quincy is to become for the first time in its life a dynamic, viable, and profitable operation and provide jobs for our people in the years ahead, it is vital that we face up to these important issues now.

In addition to our own special situations, we must face — on a daily basis — many of the same problems facing American industry as a whole. We must manage our company effectively in the face of high interest rates, accelerating inflation and serious material shortages. Each of these provides a separate challenge.

We have placed highest priority on protecting our company from the rav ages of inflation. Fortunately most of our contracts with the government and our long-term commercial contracts include escalation provisions which compensate us in whole or in part for increased labor and material costs. In some cases, we do have contracts without escalation clauses. However, in those, we have attempted to provide in our product pricing adequate protection for anticipated inflationary pressures.

Cash Flow Finance

We expect to finance our huge capital improvement programs through cash flow generated in the business and through short-term borrowings. We do not intend to shackle our company's future with long-term financing at today's exaggerated interest rates. To succeed in this, we must have our attention and that of our managers concentrated on our vital cost reduction and cash conservation programs. We have shown that we can do this in the past — and we will in the future.

The serious nationwide material shortages and increasing lead times for key components could impact the delivery schedules of our products to our customers. We have been working very hard to cultivate alternate sources of supplies and select alternate materials where possible. We are stockpiling when it makes sense. We are rearranging our production plans to work around material shortages and we are using those national priorities which some of our programs command to assure the availability of critical materials. So far, these measures have been effective in maintaining our production schedules.

Grow and Prosper

We realize that no one fully understands the true health of our national and international economies and that we will be faced with many changing economic conditions beyond our control. However, we believe that our particular company with its sound mixture of long-term government and commercial programs will continue to grow and prosper in this difficult environment.

So far, this year, we continue to progress according to plan. For the first quarter of 1974 our net earnings were $8,629,000 or 82 cents per share, compared to $7,366,000, or 70 cents per share, last year. Our sales for the quarter increased by 4.2 percent to $414,772,000.

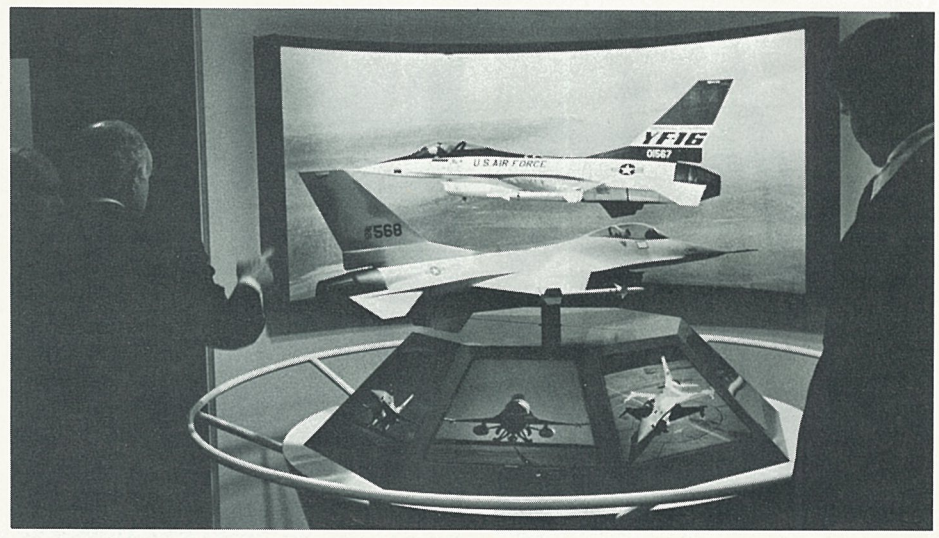
Our company is healthy, we have excellent prospects for the future, and we look for 1974 to be a better year than 1973.

In summary, I'd like to quote from the last paragraph of my letter to shareholders in the 1973 annual report.

At that time I wrote "1974 appears to be a year of challenging problems to be faced and opportunities to be grasped. We believe our company's financial and technical strengths and management experience can solve the problems and take advantage of the opportunities."

We still believe this is where we stand.

Today we face the future with optimism, with enthusiasm and with determination.



YF-16 display is viewed by shareholders. As the 1/10th scale model revolves on the pedestal a picture of the aircraft is projected on illuminated panel in background.

Asian Heart Center Voice/Video System

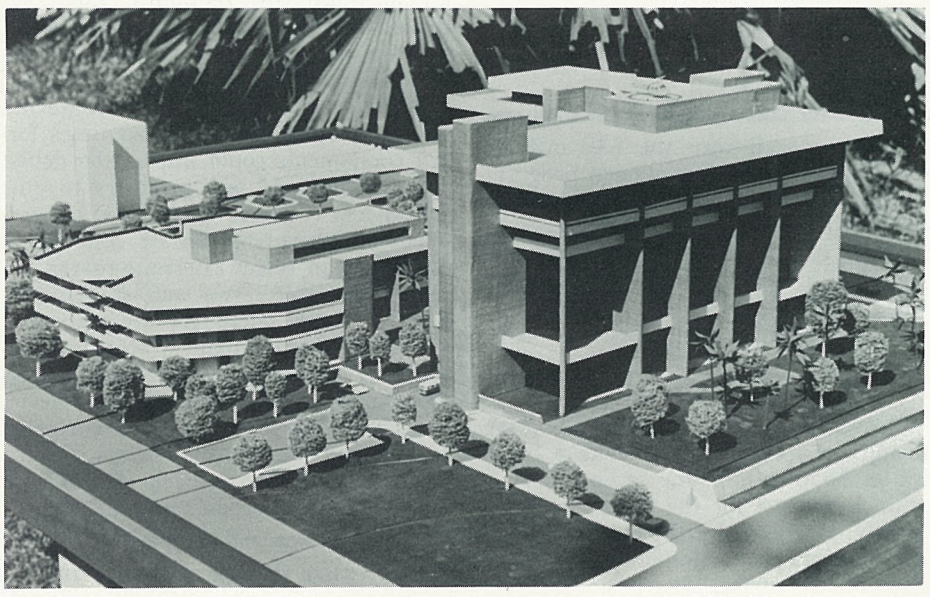
Continued from Page One

rapid calling of nursing stations and the signaling of a medical or "Code Blue" emergency. A number display on the operator's console identifies the calling telephone, enabling the operator to dispatch assistance to that location.

The CROSSREED system's inherent speed makes it especially ideal for hospital use. Call connections through this system are virtually instantaneous. TONE-DIAL pushbutton telephones are used to take full advantage of the system's speed.

This entire communications system will be installed by S-C and V. Esguerra Communications Equipment Company.

The Asian Center is a project of Mrs. Imelda Romauldez Marcos, the First Lady of the Philippines, who is also Chairman and President of the Heart Foundation of the Philippines, Inc. The project is being financed by the Government Service Insurance System.



MODEL of Asian Heart Center under construction in the Philippines.

Convair-SD and S-C Get Top Awards

Two GD divisions received special awards, at a ceremony in headquarters last month, in recognition of their outstanding contribution to the 1973 Employe Suggestion Program.

Convair-SD was declared the Best in Performance and Stromberg-Carlson was commended for showing the Most Improvement over a two year average, with a 39 percent increase in performance credits.

IMPROVEMENT — From left, Dause L. Bibby, S-C Chairman/Chief Executive Officer, Hendrix, Leonard A. Muller, S-C President/Chief Operating Officer.

Algie A. Hendrix, GD Vice President of Industrial Relations, reported that corporate-wide 5,669 employes submitted 10,164 suggestions during the year — of which 3,133 were adopted and 3,119 are still pending.

Overall, he said, the company awarded the total sum of $268,441 to employes for their ideas.

Hendrix announced that as a result of employe suggestions the company was able to save $4,636,025, 18 percent more than targeted.

Convair-FW achieved the highest savings per eligible employe of $232.75.

Canadair, Pomona, S-C and Data graphiX all exceeded the corporatewide average of $95.35 Hendrix said.

He stressed the dollar savings possible to the company as a result of accepted creative ideas and urged greater employe participation in the program.

PERFORMANCE — From left, Frank W. Davis, President Convair Aerospace Division, Hendrix, Grant L. Hansen, Vice President/General Manager Convair-SD.

GD Material Managers Convene

Material managers from 12 GD divisions and subsidiaries attended a two-day conference held at corporate headquarters last month, under the direction of John C. Kane, Director of Material.

Spokesmen from each division made presentations on specific subjects related to material management and procurement.

Especially emphasized was the impact of current shortages and price escalation; controlling inventory; minimizing waste, and surplus utilization.

The operations represented and the men in attendance were: Asbestos Ltd. — Jack Bateman; Canadair — Doug Knox, Bill Woodhouse; Convair-FW — Norm Day, Bob Kahn, Paul Logan; Convair-SD — Joe Coddou, Harvey Moose, Miles Stepich, Gerry Zahrte; DatagraphiX — Gary Johnston; Electric Boat — Lou DeMartino, Don Painter, Bob Sciullo; Electronics-SD — Chuck Felz, Roger Lynch; S-C — Dick Pelino; S-C Communications — Ed Ward; Material Service — Norman Syljebeck; Pomona — Jeff Currier, Don Tubbs; Quincy Shipbuilding — Dick King; Corporate — Larry Allen, Carl Fimmano, Everett Gray, Frank Kimmel, Len Shea.

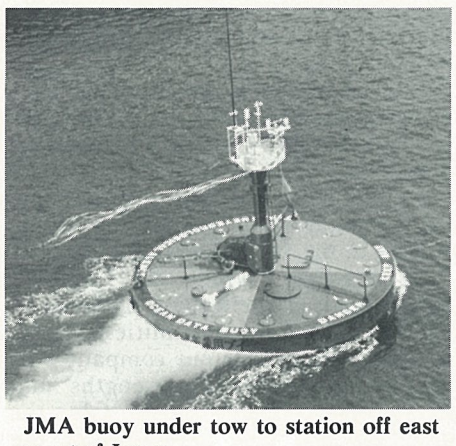
MATERIAL MEN — Seated from left: Everett Gray, Gerry Zahrte, Carl Fimmano, Dick Pelino, Norm Day, Paul Logan, Bob Kahn. Standing front row from left: Ed Ward, Harvey Moose, Larry Allen, Dick King, Don Painter, Bob Sciullo, Lon Tubbs, Doug Knox, Jeff Currier, Chuck Felz, Austin Burt, Norman Syljebeck, John Kane. Standing back row from left: Miles Stepich, Joe Coddou, Frank Kimmel, Len Shea, Gary Johnston, Lou DeMartino, Bill Woodhouse, Jack Bateman, Roger Lynch.

Japanese Firm Builds GD Buoy

An ocean data buoy built by Matsushita Communications Industrial Co. Ltd., (MCI) under a licensing agreement with GD, has gone on station off the East Coast of Japan.

The ten-meter buoy was built for the Japanese Meterological Agency (JMA) as an environmental monitor.

It transmits data every three hours to a shore station where the information is analyzed, evaluated and relayed to weather forecasters.



JMA buoy under tow to station off east coast of Japan.

Under the 1970 licensing agreement, GD's Electronics Division furnished MCI with the necessary technology to build, deploy and maintain ocean buoy systems.

The Yokohama-based company chose to utilize Electronics proven high-frequency communications equipment. The buoy hull was built by another Japanese company under subcontract to MCI. The remainder of the on-board subsystems were built by MCI under Electronics guidance.

MCI is building another ten-meter buoy for JMA which will be launched this summer. It will be moored in the East China Sea in an area described as a spawning ground for typhoons.

Additionally, a number of smaller buoys have been delivered to the Japanese Fisheries Agency for monitoring of water conditions in the inland seas.

Recommendation to Review Earnings Tax Exemptions

It's recommended that all employes review their federal and specific state earnings tax exemptions.

Social Security taxes have been increased to support an 11 percent rise in benefits, this year, to recipients.

The 5.85 percent tax rate remains the same, but the new wage scale on which payroll tax is calculated climbs to $13,200 from the former $10,800.

The maximum payroll tax for employes and employers is boosted to $772.20 apiece from $631.80 last year.

Persons desiring to change their exemptions should secure appropriate forms from their payroll/tax department.

Standard Missile Successfully Boosted from A Tactical Launcher

GD has successfully demonstrated the feasibility of launching Standard Missiles vertically from a canister launcher that might also serve as the missile's shipping container.

Hubert Wang, development project engineer for the Vertical Launch Prototype Program, said four guided flights and one ballistic flight were made from San Nicolas Island, off California coast.

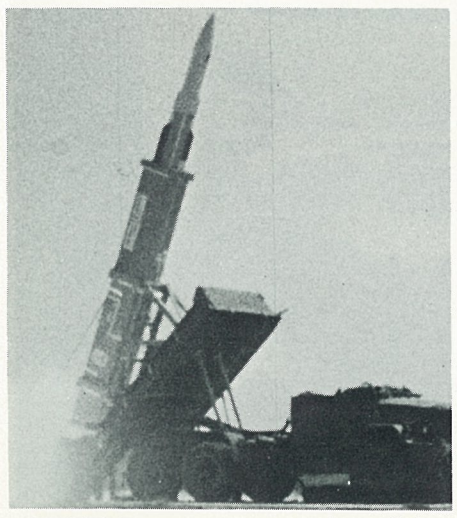
"The flights showed the omnidirectional capability of the Standard Missile and were indeed very successful."

Prior to flight, target information is fed to the missile that causes it to turn in the direction of the target after clearing the launcher.

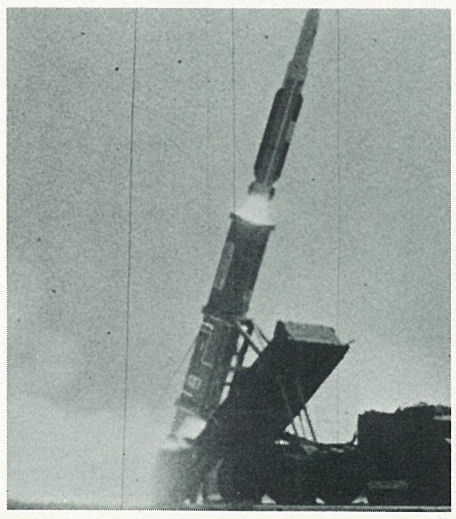
The missile uses its sophisticated guidance system to home in on the target after the aerodynamic control surfaces accomplish pitch-over from the vertical maneuver.

Usually, missile-firing combatants require a launcher to be aimed similar to a gun in a turret or turn the ship to the proper firing position. A vertical launch and control system could eliminate that procedure.

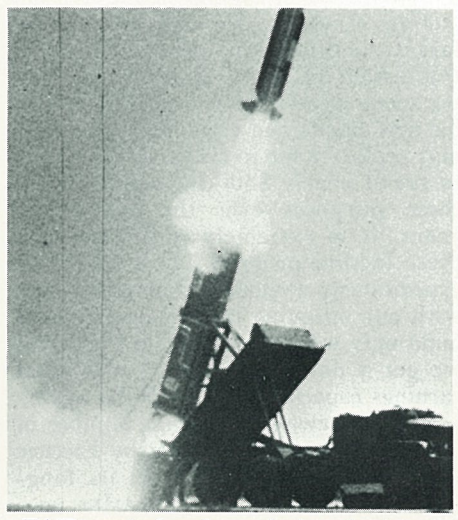
The vertical launch concept could lead to installation aboard smaller combatants and support ships for fleet defense against both air and sea targets.



MISSILE starts to emerge from lightweight tactical launcher.



CONTROL surfaces still folded as missile clears canister.



TAIL control surfaces deployed prior to pitch-over maneuver.

SUPERCRITICAL WING

F-111 TestBed in TACT Program

A supercritical wing designed and built by Convair-FW for the joint Air Force/NASA Transonic Aircraft Technology (TACT) program, is being flight tested at Edwards Air Force Base, Calif.

Several successful sorties have been made by F-111A No. 13, test bed in the TACT program which is investigating the application of supercritical wing technology to highly maneuverable aircraft at transonic speed — from slightly below to slightly above the speed of sound.

Convair-FW received the contract for the supercritical wing in 1971 from the Air Force Systems Command's Flight Dynamics Laboratory at Wright-Patterson AFB, Ohio.

The flattop-shaped wing was first test flown last November. A second flight lasting more than two hours was made from Edwards AFB in January by NASA's E. K. Enevoldson and Maj. S. R. Boyd.

A NASA project engineer termed it "a very beautiful flight." Takeoff was at a high angle of attack, he said. "It looked like the U2 taking off."

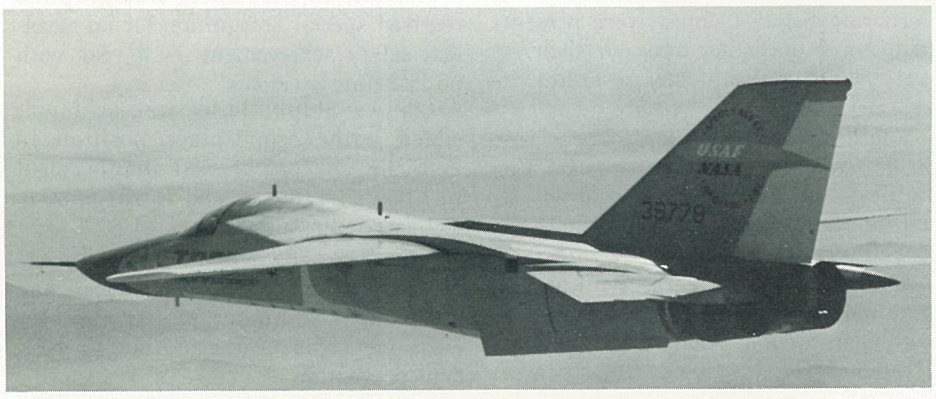
Studies made earlier by the Air Force indicated that the new airfoil design would allow for more flight efficiency at travel near the speed of sound with increased fuel economy. When the movement of an aircraft approaches the speed of sound, supersonic airflow develops about the wing.

This supersonic airflow can cause severe local disturbances known as shock waves and surface boundary layer flow separation. These disturbances cause substantial loss in flight efficiency, severe shaking and buffeting, and adversely change the stability of the aircraft.

The supercritical wing is shaped to displace rearward the shock wave that normally forms on the upper wing surface when aircraft operate near the speed of sound.

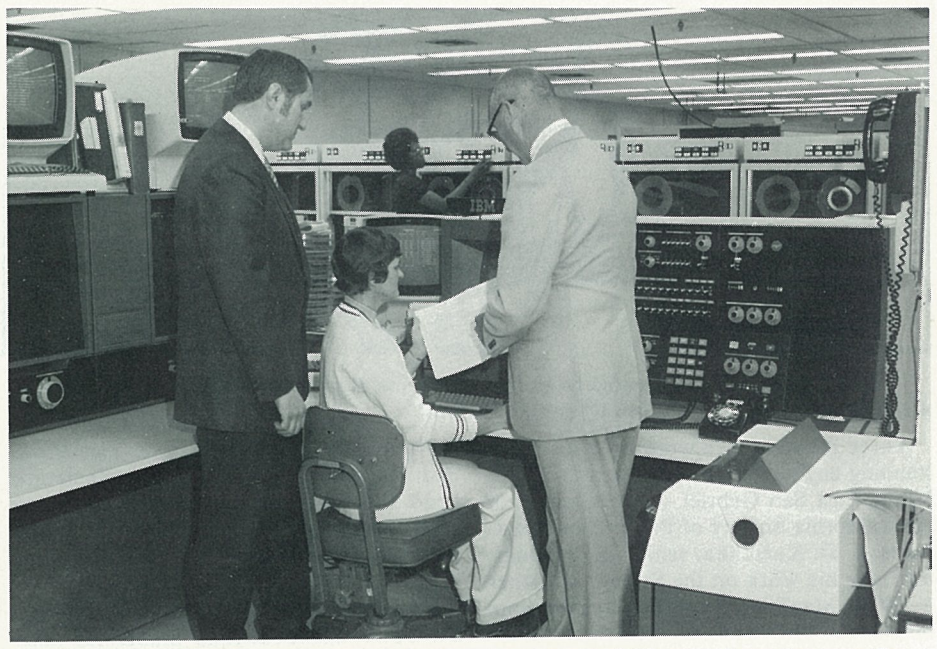
General Dynamics' F-111 was selected as the test-bed aircraft because its variable sweep-wing capabilities permit a wide range of divergent conditions and speeds to effectively flight-test the wing design.

A comparison of the conventional F-111 wing with the supercritical wing shows that although the supercritical wing is shorter, it is wider and thinner and actually has more wing area. No structural modifications were required to install the new wing for flight.



TACT — F-111A No. 13, fitted with supercritical wing, undergoing flight tests at Edwards AFB, Calif. Flattop and downward slope of airfoil is apparent.

Consolidation of Data Functions



CONVAIR-SD CENTER — C. K. Anderson, Director of Western Data Systems Center, left, watches as George DeBell, Operations Manager, checks computer printout with Irene Dionne, at console of IBM 370 computer. In background, Lucille Varner activates tape drive.

Continued from Page One

annual expenditures for data processing services will be reduced by more than 20 percent when consolidation of the function is completed.

Hardware costs at the San Diego Center, where equipment installation is completed, have already been reduced more than 25 percent with an accompanying improvement in throughput of nearly 10 percent.

Computers are used in many different ways at GD. In addition to the conventional payroll, financial and statistical systems, engineers and designers at Convair-SD, for example, use computers hooked up to typewriter-like terminals or visual display units that resemble TV picture tubes, for trying out components of varying sizes, shapes and materials.

Using a light pen, an engineer can design a part on the picture tube with the computer adjusting the drawing to reflect the angles, strengths and weights he specifies.

Under the new consolidated operation, the Western Data Systems Center will furnish services to Convair-SD, Pomona, Electronics and Stromberg DatagraphiX.

Expected to be fully operational later this year, the center is equipped with two IBM computers, models 370/158 and 370/168, and the most up-to-date software for business applications.

A Control Data computer (Cyber 70) will be used for engineering and scientific applications.

The Central Data Systems Center will service Convair-FW, the corporate office and any other Midwest requirements. It will use two IBM 370/158 computers and a Control Data 6600 computer.

The Eastern Data Systems Center at Groton will service Electric Boat, Quincy Shipbuilding, Electro Dynamic and Stromberg-Carlson Corp. (including terminals at S-C's Rochester, Sanford, Charlottesville, Camden and Ardmore facilities). The Center will use two IBM 370/158 models and a Univac 1106 already in operation.

The Canadian Data Systems Center will provide services to Canadair and Asbestos corporations using an IBM 370/65. Both the Eastern and Canadian Data Systems Centers will become fully operational next year.

The following Data Center Directors have been appointed: Western, — E. K. Anderson, previously engineering manager at Convair-SD; Central — D. H. Huckaby, former computing laboratory chief at Convair-FW; Eastern — W. P. Rausch, previously quality assurance director at EB; W. R Perkins, Systems and Computer Service Director at Canadair, will be responsible for the Canadian Center.

Convair-SD Builds Shuttle Orbiter Midfuselage

Preparations for production of the first space shuttle orbiter midfuselage section are continuing at a brisk pace at Convair-SD.

"Since our overall design configuration was approved, we have continued to move ahead on schedule in all areas leading to the production of the No. 1 flight article," Jack Hurt, Space Shuttle Subcontracts Progam Director, said.

Convair-SD received a $40 million subcontract from Rockwell International's space division, in April 1973, calling for the design and fabrication of eight articles — three for ground testing and five for flight. Requested revisions have increased the contract's value to $50 million.

The giant 13,600-pound midfuselage, comprising the payload bay of the orbiter, will be fabricated at Plant 19. Actual hardware fabrication is scheduled to begin this month. It's expected that in September parts will start to be subassembled.

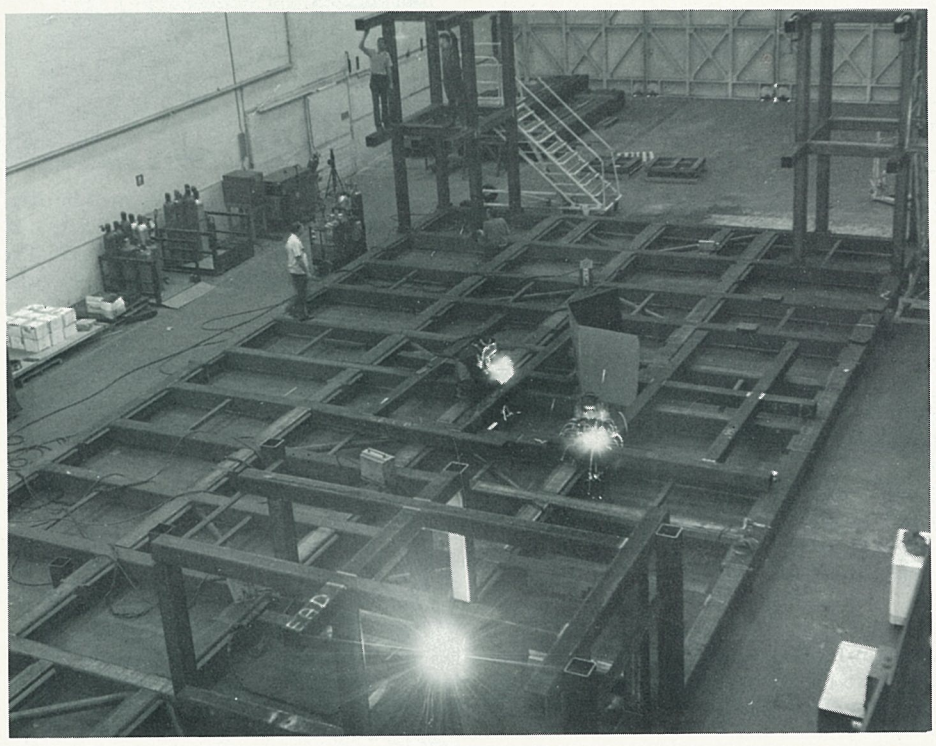
The No. 1 flight article is scheduled for delivery in March, 1975. More than 200 employes are presently assigned to the program, Hurt said.

Hurt said the basic structure will be made of conventional aluminum. However, Rockwell's Space Division recently selected boron-aluminum tubing produced by Convair-SD for use in the structure. It is also being considered for the orbiter wings supplied by Grumman Corp.

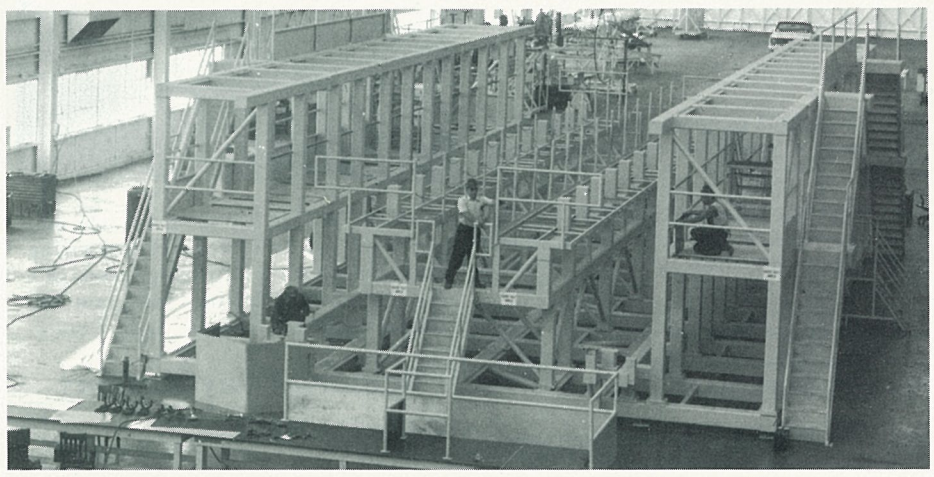
Use of the boron composite tubing rather than standard aluminum could result in a weight savings of more than 250 pounds.

After contract award last year a cadre of key personnel from Convair-SD spent several months at Rockwell International's Downey, Calif. plant. During the early phase of the program their efforts were aimed at supporting the preliminary design and preparation of definitive specifications.

Rockwell International is the prime contractor for the National Aeronautics and Space Administration's Space Shuttle. The Shuttle will be able to fly like an airplane until it leaves the atmosphere, orbit in space, and return to a runway landing on earth like a conventional plane.



SHUTTLE SPARKS — Flashes from welding torches fly as major assembly fixture for midfuselage section of the space shuttle begins to take shape at Convair-SD.



MIDFUSELAGE fixture after completion and setup in assembly area.

Expansion Underway

Continued from Page One

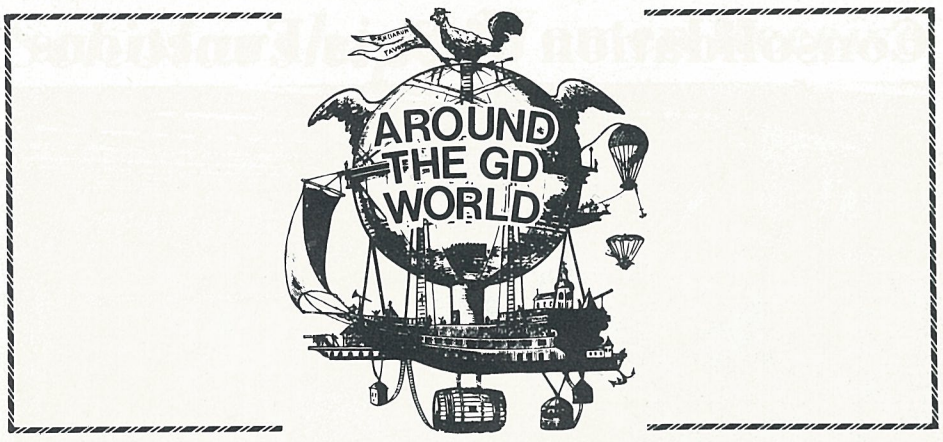
also a director of Esmark, Inc., TWA and Continental Illinois Corp.

Lewis singled out the company's new FY-16 lightweight fighter prototype — now undergoing flight tests at Edwards AFB, Calif. — for special mention.

The plane has flown successfully 43 times since February and "The results have been most encouraging," he said. "Our Fort Worth people have, without a doubt, designed and built a superb airplane."

Although the Air Force originally had no plans for production of the YF-16 or Northrop YF-17 advanced technology prototypes, this has gradually changed.

"As the great value of the lightweight fighter has become better appreciated . . . there is now a very real and increasing interest by the Air Force in the procurement of a low-cost, high-performance fighter," Lewis said.



This column will be devoted to mentioning items of interest concerning the activities of employes around the General Dynamics World.

Three Pomona men were cited for "outstanding engineering achievement" recently by the East San Gabriel Valley Chapter of the California Society of Professional Engineers: J. D. Kutschka, senior design engineer, for his work on the Stinger launcher — W. L. MacTurk, manufacturing development specialists, for an all plastic antenna system — R. W. Thorpe, engineering staff specialist, for his contribution on a digitally-synthesized microwave signal source.

* * *

Two Convair-SD men hold high posts in the San Diego section of the Instrument Society of America. Dean O. Whitney is president and Charles A. Dunkle is vice-president. Both men are assigned to the structural test measurements department.

* * *

Victor T. Boatwright, technical assistant to the engineering director at EB, has been named president of the United Fund for Southeastern Connecticut.

* * *

Two Convair-FW officials, R.E. 'Dick' Adams, Vice President/General Manager and E. R. McCarthy, Controller, will assist the United Way of Metropolitan Tarrant County's 1974 fund drive. Adams has been named campaign vice chairman for major employe group support and McCarthy will be a member of the agency relations committee.

* * *

C. W. 'Smokey' Doyle, Director of Cost Reduction and Value Control for Convair-FW, recently was recognized by the Society of American Value Engineers for his service to value engineering and awarded a lifetime honorary membership, the Society's highest tribute.

Algie A. Hendrix, Corporate Vice President-Industrial Relations, was selected to head the 1974 Multiple Sclerosis Hope Chest campaign for the St. Louis chapter of the National Multiple Sclerosis Society.

* * *

Edward E. Lewis, manager of Stromberg-Carlson's Camden, Ark. plant, has been named chairman of Camden's Board of Adjustments. He was also recently elected second vice president of the Camden Chamber of Commerce.

* * *

Herb B. Day, chief of communications services Convair-SD, a charter member of the National University Alumni Association, has been re-elected its president.

* * *

John Coons, Jr., S-C's Camden manager of industrial relations has been named president of the 1974 United Fund Campaign. He is also education chairman for the Camden Chamber of Commerce.

* * *

Chester W. Cecil, Logistics Projects Director at Convair-FW, has been elected vice chairman of the Product Support Committee of the Aerospace Industries Association. Cecil, a former major general, had 32 years of service in the USAF. He is on the Board of Directors of the Fort Worth Symphony Orchestra Association and the Boy Scouts of America Longhorn Council, a member and a past district director of the Society of Logistics Engineers.

* * *

Don Lemmon, Manager of Industrial Relations at Stromberg-Carlson's Ardmore, Okla. plant, has been appointed to the State Fuel Conservation Commission, by Governor David Hall.

Appointments/Advancements

Melville R. Barlow, a 19-year veteran with GD, has been appointed Corporate Director of Data Systems Services. Barlow will have responsibility for all data processing activities in the Corporation, and will implement the nationwide consolidation plan. He was previously Program Director of the Standard Missile-1 at Pomona Division.

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Paul E. Schwab, a 22 year veteran with GD, has been named Director of Marketing for the Electronics Division. His most recent assignment was as marine and tactical weapon systems director in the D.C. office.

* * *

Louis C. Gallo, who joined Stromberg-Carlson in 1967 as a customer engineering supervisor, has been appointed to the new position of Installation Engineering Manager.

J. B. Blair, who started with S-C in 1966 as assistant chief installer, has been named Installation Manager for the Florida region.

Ervine G. Byrnes, who joined S-C in 1969 as supervisor of installation methods and procedures, has been named Installation Manager of the new Eastern region. He is responsible for customer service in the Rochester, Atlanta and St. Petersburg offices.

Richard A. Frediani, with S-C since 1962, first as field technical assistant and later national service manager, has been named Western Installation Manager in charge of customer service in Chicago, Kansas City and Burlingame, Calif.

* * *

Michael A. Dolan, Philip M. Ford and David C. Kartye have joined the Corporate Office. Dolan, consolidation accountant, has a B.S. in accounting from the University of Missouri. Ford, financial analyst, received his B.S. in business administration from Southern Illinois University. Kartye, tax administrator, is a C.P.A. and holds a B.S.C. in accounting from St. Louis University.

* * *

David W. Paull, who joined Stromberg-Carlson in 1955 as a production engineer, has been appointed Manager of Industrial Engineering. He has held responsible positions in manufacturing and production engineering supervision. Paull is a mechanical engineering graduate of Clarkson College of Technology in Potsdam, N.Y.

* * *

Charles D. Walbrandt has been named Corporate Manager of Employe Benefit Plan Fund Investments. He has an extensive background in institutional investment and corporate fund management, including the First Trust Co. of St. Paul, Monsanto and the Wurlitzer Co. Walbrandt is a graduate of the University of Wisconsin and holds a M.B.A. in finance from St. Louis University.

* * *

Charles M. Young, who joined Stromberg-Carlson in 1972 as assistant to the marketing vice president, has been appointed Product Marketing Director for station equipment.

* * *

Frank Kimmel has been appointed Corporate Manager-Industrial Engineering. He had a long career with Western Electric Co. Kimmel has a B.S.M.E. from Illinois Institute of Technology and M.S. in Industrial Management from Loyola University.

* * *

Lewis Fincke, who joined Stromberg-Carlson as a senior financial analyst in 1967, has been appointed S-C Financial Controller. He was previously a GD corporate auditor for five years. Finke received his B.B.A. degree from Iona College.

* * *

William V. Cox has been named Vice President and General Counsel of Stromberg-Carlson. Cox is a former member of the corporate legal staff of Continental Oil Co. in Stamford, Conn. He is a graduate of Princeton University and Yale Law School.

CL-84 tilt wing V/STOL descending to deck of the USS *Guadalcanal* after operational evaluation performance trials, in March, conducted with the carrier cruising 60 miles off the Virginia coast. During the 12-day cruise many dummy 500 and 1000 pound bombs were successfully dropped. The aircraft's STOL/VTOL and flying qualities were evaluated. The U. S., Canada and United Kingdom are participating in a tripartite program at Patuxent River, Md.

Awards for Safety Achievement

Chairman's Awards for the 1973 Corporate Safety Contest were presented to three operating units for their respective accomplishments, at headquarters last month.

The Electronics Division was declared the top winner in two categories: For the Best Record in Safety Achievement, and for the Greatest Reduction in Accident Frequency.

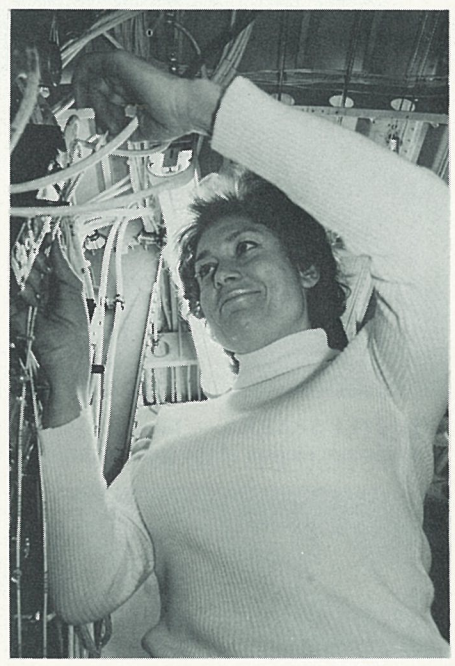
Convair-FW received a certificate for outstanding attainment in Safety Improvement for the Greatest Reduction in Accident Severity.

In addition, Stromberg DatagraphiX received special recognition for an excellent safety achievement — a year with no lost-time accidents.

Quincy Shipbuilding was acknowledged with second-place position in both the category of Best Improvement in Frequency Rates, and Best Improvement in Severity Rates.

These awards indicate GD's concern for the safety of its employes and serve as a reminder of the need for everyone's constant attention to accident prevention.

SAFETY AWARDS were presented by Algie A. Hendrix, GD Vice President-Industrial Relations, center, to standing from left, J. R. Iverson, Vice President/General Manager Electronics Division; Frank W. Davis, President Convair Aerospace Division; Vice Presidents/General Managers — R. E. Adams, Convair-FW and E. T. Keating, Stromberg DatagraphiX.



PANEL MEMBER — Canadair employe, Gloria Lefievre, is shown wiring harnesses on main distribution panel of a CL-215 aircraft destined for Spain, her former country. .

Memorial Day Holiday

Memorial Day, May 27, will be observed by General Dynamics employes at all U. S. divisions and subsidiaries.

AT HOME CHECKLIST FOR CONSERVATION

Conserving energy at home is something everyone can do without too great a lifestyle change. If you survey home surroundings you're sure to find many effective ways to conserve energy and save money in the process.

Cooling — Remember to raise the thermostat a few degrees and wear lighter clothing, open windows when you can instead of running the air conditioner and turn off unnecessary lights, close draperies during the day.

Heating — Lower the thermostat a few degrees and wear heavier clothing; close the draperies at night; keep the fireplace damper closed; don't heat empty rooms; keep furnace in good condition, fix leaky faucets and prevent drafts from open windows and attic doors.

GENERAL DYNAMICS *World*

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Sanford Berns . . . *Editor*